Evaluation Report

OFFICE OF THE INSPECTOR GENERAL

STRATEGIES FOR IMPROVING DOD ENVIRONMENTAL COMPLIANCE ASSESSMENT PROGRAMS

Report No. 97-009 October 28, 1996

DEPARTMENT OF DEFENSE

Additional Copies

To obtain additional copies of this audit report, contact the Secondary Reports Distribution Unit of the Analysis, Planning, and Technical Support Directorate at (703) 604-8937 (DSN 664-8937) or FAX (703) 604-8932.

Suggestions for Future Audits

To suggest ideas for or to request future audits, contact the Planning and Coordination Branch of the Analysis, Planning, and Technical Support Directorate at (703) 604-8939 (DSN 664-8939) or FAX (703) 604-8932. Ideas and requests can also be mailed to:

OAIG-AUD (ATTN: APTS Audit Suggestions)
Inspector General, Department of Defense
400 Army Navy Drive (Room 801)
Arlington, Virginia 22202-2884

Defense Hotline

To report fraud, waste, or abuse, contact the Defense Hotline by calling (800) 424-9098; by sending an electronic message to Hotline@DODIG.OSD.MIL; or by writing the Defense Hotline, The Pentagon, Washington, D.C. 20301-1900. The identity of each writer and caller is fully protected.

Acronyms

DUSD(ES)	Deputy Under Secretary of Defense (Environmental Security)
ECAMP	Environmental Compliance Assessment Management Program
ECAS	Environmental Compliance Assessment System
ECE	Environmental Compliance Evaluation
EPA	Environmental Protection Agency
FMECI	Federal Facilities Multi-Media Enforcement/Compliance Initiative
GAO	General Accounting Office
ISO	International Organization for Standardization
TEAM	The Environmental Assessment and Management (Guide)
TQEM	Total Quality Environmental Management

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202-2884

October 28, 1996

MEMORANDUM FOR DEPUTY UNDER SECRETARY OF DEFENSE
(ENVIRONMENTAL SECURITY)
ASSISTANT SECRETARY OF THE NAVY (FINANCIAL MANAGEMENT AND COMPTROLLER)
ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Evaluation Report on Strategies for Improving DoD Environmental Compliance Assessment Programs (Report No. 97-009)

We are providing this evaluation report for information and use. This report is the first of two evaluation reports on the subject. Management comments on a draft of this report were considered in preparing the final report.

Comments on the draft of this report conformed to the requirements of DoD Directive 7650.3. Recommendation 1.c. was added after the draft report was published. Therefore, we request the Deputy Under Secretary of Defense (Environmental Security) to consider Recommendation 1.c. and to provide additional comments in its response to the final report by January 6, 1997.

We appreciate the courtesies extended to the evaluation staff. Questions on the evaluation should be directed to Mr. William C. Gallagher, Evaluation Program Director, at (703) 604-9270 (DSN 664-9270) or Mr. Michael R. Herbaugh, Evaluation Project Manager, at (703) 604-9294 (DSN 664-9294). If management requests, we will provide a formal briefing on the evaluation results. See Appendix K for the report distribution. The evaluation team members are listed inside the back cover.

David Steensma

David K. Steensma
Deputy Assistant Inspector General
for Auditing

Office of the Inspector General, DoD

Report No. 97-009
(Project No. 6CB-5006)

October 28, 1996

Strategies for Improving DoD Environmental Compliance Assessment Programs

Executive Summary

Introduction. The Deputy Under Secretary of Defense (Environmental Security) has stressed the importance of a proactive approach to the DoD Environmental Quality Program and of encouraging the Military Departments to continually improve their programs. Environmental compliance assessment serves as a tool to verify and help improve environmental performance. This report is the first of two evaluation reports discussing strategies for improving the DoD compliance programs.

Evaluation Objectives. The evaluation objectives were to review the DoD environmental compliance assessment programs, examine innovative approaches used by other Federal agencies and the private sector, and recommend improvements to DoD programs.

Evaluation Results. The Military Departments have had environmental compliance assessment programs in place since the 1980s and have made various improvements to them. However, those programs still lacked an important feature that could make them significantly more effective. The Services (the Army, the Navy, the Air Force, and the Marine Corps) do not adequately determine the root causes of deficiencies they identify in their environmental compliance assessment programs. The absence of an adequate root cause analysis often results in failure to identify, understand, and correct the real cause of compliance deficiencies.

Summary of Recommendations. We recommend the Services incorporate in-depth root cause analysis of environmental compliance deficiencies in their environmental compliance assessment programs. Embracing root cause analysis includes adopting a standard root cause analysis methodology, conducting training on how to conduct effective root cause analysis, and following up to ensure root causes are corrected. Recommendations in this report, if implemented, will result in fewer instances of non-compliance and fewer resources needed to correct noncompliances.

Management Comments. The Deputy Under Secretary of Defense (Environmental Security), the Army, and the Air Force agreed to identify a root cause analysis methodology and to adopt that methodology in their compliance assessment program. The Navy partially concurred with the recommendation for the Deputy Under Secretary of Defense (Environmental Security) to form a working group to review methods for conducting root cause analysis; however, the Navy stated that it was premature to ascertain whether a standard methodology would be appropriate for the Services.

Evaluation Response. A methodology that is compatible to one Service would be compatible to the other Services. Using the same methodology provides uniformity across the Services. Uniformity is paramount for identifying, tracking, and correcting root causes. The root causes identified for compliance discrepancies are the same, tracking and followup of those root causes will be consistent, and the necessary training for those performing the root cause analysis will be compatible across the Services. For the reasons discussed in Part I, we believe the recommendations are valid. The recommendation to incorporate the selected methodology into DoD guidance was added after the draft report was published. We request the Deputy Under Secretary of Defense (Environmental Security) to consider the recommendation and to provide additional comments in its response to the final report by January 6, 1997.

Table of Contents

This page was left out of orignial document

This page was left out of orignial document

Part I - Evaluation Results

Evaluation Background

The Deputy Under Secretary of Defense (Environmental Security) (DUSD[ES]) has stressed the importance of a proactive approach to the DoD Environmental Quality Program and encouraged the Services (the Army, the Navy, the Air Force, and the Marine Corps) to continually improve their programs. Benefits of proactive environmental programs include improved compliance with environmental laws, reduced environmental impacts, reduced exposure to legal actions, cost savings from operating efficiencies and avoided cleanup, and better relationships with the regulators and the public.

In the 1980's, recognizing the seriousness of noncompliance and supporting their commitment to attaining and sustaining compliance with all applicable environmental laws and regulations, the Services and other DoD organizations implemented environmental compliance assessment programs. The DoD adoption of environmental compliance assessments represents a management decision to seek compliance proactively, instead of simply reacting to crises. Environmental compliance assessment serves as a tool to verify and help improve environmental performance.

Definition of Environmental Assessment/Evaluation/Auditing. In its 1986 Environmental Auditing Policy Statement, the U.S. Environmental Protection Agency (EPA) defined environmental auditing as "a systematic, documented, periodic and objective review by regulated entities (including Federal facilities) of facility operations and practices related to meeting environmental requirements." Environmental audits can verify compliance with environmental requirements and evaluate the effectiveness of environmental management systems already in place. The Services and other DoD organizations use the terms "environmental assessments" and "environmental evaluations" to mean "environmental audits." We use the terms interchangeably throughout this report.

Impetus for Environmental Auditing. No laws currently require environmental auditing. Although environmental auditing is a voluntary activity, it is relatively widespread among larger organizations in the manufacturing and processing industries. Organizations have adopted the practice for sound business reasons. The benefits include reduced risks from environmental hazards; minimized future environmental damage and cleanup costs; better identification, resolution, and avoidance of environmental problems; improvements to management practices; fewer and less serious findings of violations; fewer incidents and accidents; and reduced fines and penalties, attributable to the effectiveness of an audit program in discovering and correcting compliance deficiencies before they are discovered by others. In addition, organizations using environmental auditing see increased focus of facility managers' attention on current and upcoming regulatory requirements; greater overall awareness for top management of practices related to environmental compliance; and a positive perception by regulators, employees, stockholders, and the public.

In its Environmental Auditing Policy Statement, the EPA encourages all Federal agencies to institute environmental auditing systems to help ensure the adequacy of internal systems to achieve, maintain, and monitor compliance.

Effective Environmental Audit Program Elements. The EPA Environmental Auditing Policy Statement identified performance-oriented "Elements of Effective Environmental Auditing Programs." Those elements include:

- o top management support;
- o followup on audit findings;
- o independent auditors;
- o adequate team staffing and training;
- o explicit program objectives;
- o a process for collecting, analyzing, and documenting information; and
- o procedures for writing reports.

The EPA believes the most mature, effective environmental auditing programs incorporate each of those general elements in some form. It also considers them useful yardsticks for those considering adopting or upgrading audit programs. The Office of the Inspector General, DoD, also reflected those elements in the rating factor index we developed to characterize an effective auditing program, as discussed in Inspector General, DoD, Report No. 92-011, "Environmental Compliance Assessment Programs," November 8, 1991. See Appendix C for additional information on the EPA Environmental Auditing Policy Statement and the Office of the Inspector General, DoD, rating factor index.

DoD Environmental Compliance Assessment Programs. Inspector General, DoD, Report No. 92-011 stated that the DoD Components had not fully and effectively implemented an environmental compliance assessment program. Since then, with management attention and resource investment, the Services have strengthened their programs. In General Accounting Office (GAO) Report No. RCED-95-37 (OSD Case No. 9835), "Environmental Auditing: A Useful Tool That Can Improve Environmental Performance and Reduce Costs," April 3, 1995, the GAO acknowledged significant progress by the DoD toward developing effective environmental audit programs. Further, the Air Force has implemented a comprehensive environmental audit program and has embraced environmental auditing as a way to avoid creating new environmental problems and to ensure compliance with environmental requirements.

See Appendix D for a summary of characteristics of each Services' environmental compliance assessment program and descriptions of program guidance and interservice joint efforts.

Opportunities to Upgrade DoD Environmental Compliance Assessment Programs. As organizations gain experience in using environmental compliance assessments, they find different approaches to maximize results and improve efficiency and effectiveness. Two important trends in environmental assessment program design, content, and coverage are occurring.

Root Cause Analysis. First, there is an increase in rigor and depth of review. Many organizations are integrating root cause analysis into their assessment designs. Root cause analysis is a rigorous process used to identify a deficiency, determine its significance, and identify the causes and reasons for the occurrence of significant deficiencies. Once the root causes are identified and corrected, the deficiency should not recur. See the finding discussion for details on root cause analysis.

Environmental Management System. The second important trend is the shift in orientation of environmental audit programs from assessment (focus on the identification of compliance problems) to compliance verification (systematic, rigorous verification of areas which appear to be "in good shape") and ultimately to a management system (focus on the review of the underlying programs, procedures, and systems that are in place to ensure ongoing compliance). This trend will be the subject of a follow-on evaluation report.

Evaluation Objectives

The evaluation objectives were to review the DoD environmental compliance assessment programs, examine innovative approaches used by other Federal agencies and the private sector, and recommend improvements to the DoD programs. See Appendix A for the evaluation scope and methodology and Appendix B for a discussion of prior audits and other reviews related to the evaluation objectives.

Root Cause Analysis

Efforts by the Services to identify and correct fundamental causes (root causes) of deficiencies in environmental compliance, especially management control weaknesses, have not been very successful. At 13 DoD locations, we identified 14 trend deficiencies; that is, the same deficiencies which occurred at six or more DoD installations. Of the 14 trend deficiencies, 11 were identified by a previous major command or self-assessment report. Fundamental causes of the deficiencies have not been identified and corrected because:

o the root cause analysis methodology that is needed to ensure analytical integrity and comparability is not in place;

o the Services lack policy requiring oversight, reporting, tracking, and follow-up of root cause analysis results; and

o the Services are not training personnel on how to conduct effective root cause analysis.

As a consequence of not identifying and correcting the fundamental causes of deficiencies, the Services use unnecessary manpower and budgeted funds identifying and correcting repeat deficiencies. Also, DoD installations face continuing noncompliance and increased enforcement actions because regulatory agencies target facilities with repeat deficiencies.

Description of Root Cause Analysis

Definition. The Department of Energy Report No. DOE-STD-1004-92, "Root Cause Analysis Guidance Document," February 1992, defines root cause as:

> . . . the cause that, if corrected, would prevent recurrence of that and similar occurrences. One of many possible generic occurrences that is attributable to a demonstrated link between a deficiency and the factors contributing to the deficiency . . . . There may be a series of causes that can be identified, one leading to another. That series [of causes] should be pursued until the fundamental, correctable cause has been identified.

Approach. An approach like the one used by the Department of Energy should always be followed when conducting root cause analysis. Each of the four elements of the Department of Energy approach and its application is explained below.

Identifying the Deficiency. The first element of the Department of Energy approach to root cause analysis is to identify the deficiency. That deficiency is the condition, situation, or action that was not wanted or planned and is usually a violation of a regulatory requirement. The occurrence of a deficiency is the indicator that a problem requires corrective action.

Determining the Significance. The Department of Energy determines significance by assigning a level of risk to an identified deficiency. The determination of significance dictates the level of effort expended to identify the root cause. The level of risk for a deficiency may be low or high or in between. A low risk deficiency may be related to an administrative detail that is not very significant and results in minimal risk to health and human environment. A high risk deficiency may be related to a situation that could result in releases of toxic substances into the environment. Deficiencies identified as low risk may be significant if recurrence draws the attention of the regulators, subjecting the installation to regulatory actions.

Identifying the Causes. The Department of Energy identifies the causes for each deficiency. Those causes are the conditions (the persons, events, or situations) in place immediately before the occurrence of the deficiency. Identifying those conditions helps identify the reasons the deficiency occurred.

Identifying the Reason. Finally, the Department of Energy identifies the reason for the deficiency. The reason for the deficiency is the root cause of the deficiency. Identifying and correcting the reason for the deficiency will result in eliminating that deficiency and preventing its recurrence.

Methods. A number of root cause analysis methodologies are available and are being used effectively in the private sector and elsewhere. Five root cause methods are identified and briefly discussed in Appendix E. Those methods are events and causal factor analysis, change analysis, barrier analysis, management oversight and risk tree analysis, and human performance evaluation. Each methodology has its strong and weak points depending on how it is used. An established root cause analysis methodology necessary to assure analytical integrity and comparability should be used to identify the true and fundamental causes of a deficiency. Selecting a particular root cause methodology should be at the discretion of the user. The methodology used should depend on the situation in which that methodology is to be used. It is to the advantage of an organization to adopt a single version for its own use.

Data Analysis. Having one version of root cause analysis methodology within an organization makes it possible for the organization to combine, compare, and contrast data.

Training. A single methodology version simplifies the task of training auditors to use root cause analysis methods. Unless a uniform understanding exists of how root cause analysis data are identified and how the data relate to a deficiency, identifying the root cause of a deficiency and eliminating that root cause will be difficult.

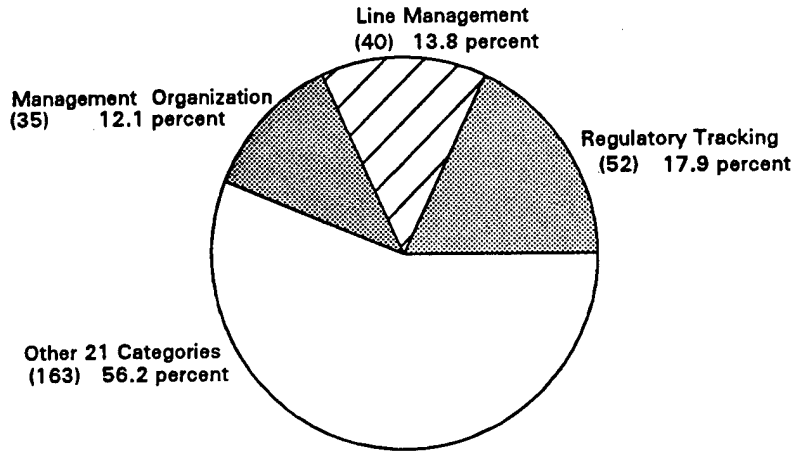
Analysis of DoD Compliance Assessment Deficiencies

We conducted an analysis of the results from the Federal Facilities Multi-Media Enforcement Compliance Initiative conducted by the EPA at 26 DoD locations during FY 1994. Our analysis of root cause categories links a significant portion of the trend deficiencies found in the EPA initiative to organizational management weaknesses.

Root Cause Categories. We discussed each trend deficiency with staff at the sites we visited and identified one or more appropriate root causes for each deficiency. We used the list of the root causes included as Appendix I, which is a modified version of root causes developed by the Department of Energy. The modified Department of Energy list consists of 24 root cause categories, with numerous root cause elements under each. More than one root cause category element was chosen for a trend deficiency, as warranted. We recorded a total of 290 root cause category elements for the 14 trend deficiencies identified and discussed at the 13 installations we visited. Environmental management inefficiencies accounted for a significant percent of the root cause category elements.

Environmental Management Weaknesses. Our analysis of the root cause data shows that, of the 24 root cause categories, three accounted for almost half (44 percent) of the total 290 root cause category elements recorded.

The three categories, shown in the following chart, are environmental management weaknesses.



Three Most Frequently Cited Management Root Cause Categories Among 290 Cited

Appendix Tables H.1. and H.2. show details on how those root cause categories are spread among the three program areas of hazardous waste containers under the Resource Conservation and Recovery Act; polychlorinated biphenyls under the Toxic Substances and Control Act; and, National Pollutant Discharge Elimination System discharges under the Clean Water Act.

Regulatory tracking by itself accounted for about half of the total root cause categories attributable to the three program areas. It accounted for 76 percent of the root cause categories recorded by the polychlorinated biphenyl program. Regulatory tracking refers to the ability of management to stay up-to-date with all applicable regulations and requirements and to keep appropriate staff effectively up-to-date as well. Management organization includes aspects of communications, organizational structure, and administration. Line management refers to management responsibilities at the execution level or first-line-supervisor level.

Repeat Deficiencies. Repeat deficiencies indicate a systemic problem (a problem that occurs because of a flaw in organizational policy, procedures, and processes) in the DoD environmental assessment program. In order to determine whether repeat deficiencies were occurring at an installation, we reviewed the deficiencies identified in major command assessment or self-assessment reports conducted prior to the FY 1994 EPA Multi-Media Initiative. We developed a list of repeat deficiencies by comparing the major command or self-assessment deficiencies with the 14 trend deficiencies from the FY 1994 EPA Multi-Media Initiative. Of the 13 installations that we visited, one did not provide a previous major command or self-assessment report.

We compared the twelve major command or self-assessment reports with the FY 1994 EPA Multi-Media Initiative reports. Of the 14 trend deficiencies, 11 trend deficiencies were identified in a previous major command or self-assessment report. Those 11 repeat trend deficiencies were spread across seven installations. Five installations had a single repeat deficiency, while one installation had four repeats and one installation had two repeats. The Army had four repeat deficiencies; the Air Force, five; and the Navy, two. The Army and the Air Force, both of which just started including root cause codes in their environmental compliance assessment protocols, had a majority of the 11 repeat deficiencies, implying that their root cause analysis programs need improvement.

Models for Root Cause Analysis

Many organizations currently use root cause analysis. These organizations include the Federal Government, international coalitions, and private industries. The following models highlight the importance that such organizations place on root cause analysis.

Environmental Protection Agency. Sources at EPA headquarters told us that the EPA does not have written policy requiring root cause analysis, but recommends its use to improve environmental compliance programs. They also told us root cause analysis is often a requirement included in enforcement actions taken because of repeat or flagrant deficiencies.

Department of Energy. The Department of Energy developed a comprehensive root cause analysis methodology several years ago. Its root cause analysis program is used with its environmental compliance audit program.

International Organizations. Leading businesses that advocate worldwide environmental excellence comprise the Global Management Environmental Initiative, commonly known as GEMI. One initiative that the GEMI promotes is Total Quality Environmental Management (TQEM), a tool for improving corporate environmental performance. Today, many companies are learning that TQEM can be an effective strategy for improving their environmental performance. TQEM stresses that an organization recognize and eliminate problems before they occur. One basic element of TQEM is "cause and effect," or root cause analysis. TQEM uses a "cause-and-effect diagram" to identify root cause. The cause-and-effect diagram is a qualitative summary of all potential causes of a problem. Each response to the question "why" becomes a branch on a "fishbone" diagram until the root cause, rather than the symptom, is identified.

The principles associated with the International Organization for Standardization (ISO) 14000 on Environmental Management support a TQEM process and the use of root cause analysis to strengthen and improve environmental programs.

The ISO Technical Committee 207 is drafting international standards for environmental management, including standards and guidelines for environmental audits and root cause analysis.

Private Industry. Progressive companies in private industry are adopting root cause analysis as a primary technique to identify and focus on permanent solutions to compliance problems. For instance, in 1993, TEXACO, Inc., began using root cause analysis in its environmental auditing process. The methodology requires a specific sequence of considerations on the part of the auditor in arriving at the selection of a root cause.

Appendix G contains more information on the root cause analysis methodology TEXACO used in auditing and managing its own environmental compliance program. Two root cause categories (insufficient resources and organization or overall management deficiencies) are not included in the accompanying root cause analysis procedures. A TEXACO representative informed us that TEXACO does consider those root causes in carrying out the analysis and for corporate policy reasons promulgates those causes separately from its audit report.

Guidance on Root Cause Analysis

DoD. We were unable to identify any Office of the Secretary of Defense guidance requiring root cause analysis. However, the Services have applied root cause analysis to varying degrees. The Services have published guidelines and policy for the conduct of environmental compliance assessment programs. Mostly, that policy is general in nature, allowing the major commands and installations the flexibility to organize environmental compliance assessment programs as they see fit.

At the present time, DoD has not adopted a root cause analysis standard or methodology. The Army and the Air Force include root causes in their compliance assessment protocols, but do not discuss how to apply root causes to deficiencies. The Navy and the Marine Corps do not use root cause analysis in their compliance assessment programs, except on a limited basis by certain individuals. The Air Force Air Combat Command currently performs root cause analysis, but not in the most effective manner.

The Army and the Air Force root cause analyses are often too shallow, lacking sufficient detail to identify why the deficiency occurred. For example, the root causes identified are often limited to lack of training, personnel shortages, and lack of budgeted funds. Simply identifying lack of training as the root cause for the occurrence of a compliance deficiency such as mislabeling a drum of hazardous waste does not answer the question of why training was not provided or made available to those responsible for labeling the drum.

Department of the Army. The U.S. Army Construction Engineering Research Laboratory Special Report 95/05, "The Active Army Supplement for the

Environmental Assessment and Management (TEAM) Guide," provides for the use of root cause analysis. See Appendix F for a list of root cause codes the Army uses with its Environmental Compliance Assessment System (ECAS) software. The ECAS software is used to prepare the ECAS findings and corrective actions. The root cause codes fall into four categories: materials, personnel, equipment, and techniques. Several of the root cause codes are not specific enough to provide meaningful information on systemic problems. For example, root cause code number P7, insufficient skills, is one of 19 root cause codes the Army uses to identify causes. "Insufficient skills" is too general to be of practical use in correcting a deficiency.

Questions that remain when using root cause code number P7 include the following.

o Was an unskilled individual allowed to perform environmental work because installation personnel did not know of the requirement to train, lacked funding for training, considered the requirement to train unnecessary, or other reasons?

o Was an environmental function assigned to an unskilled individual because trained personnel were not available or because they lacked the time to perform that function?

Department of the Navy. Although in some situations individual evaluations may seek to identify root causes, Navy representatives could not provide us with any examples where they conducted root cause analysis in their Environmental Compliance Evaluation (ECE) Program. The Navy ECE guidance does not specifically require root cause analysis. In September 1994, the Center for Naval Analysis conducted a study on issues surrounding Notices of Violation and the Navy Environmental Compliance Program. The study recommends that the Navy Notices of Violation data base include information about the causes of Notices of Violation.

Department of the Air Force. The Air Force Environmental Compliance Assessment Management Program (ECAMP) supplement to the TEAM Guide addresses root cause analysis; however, the ECAMP does not provide detailed guidance about root cause analysis. In the section explaining what should be included in Chapter 3.0, "Environmental Compliance Status," for ECAMP reports, the supplement states that where recommendations for deficiencies are made, the recommendations should focus on resolving root causes. The supplement provides limited guidance on how to identify root causes and states that assessment teams are under no obligation to make recommendations.

The Air Force Air Combat Command uses root cause analysis only for deficiencies related to enforcement actions, not for all compliance deficiencies. The Air Combat Command has not published policy or procedures for using root cause analysis. Personnel conducting ECAMP assessments do not receive training in root cause analysis. However, a checklist of probable causes is available for use when conducting an ECAMP. Air Combat Command is revising that checklist for use in the near future.

U.S. Marine Corps. The Marine Corps environmental compliance assessments did not reveal the use of root cause analysis for deficiencies.

Benefits of Root Cause Analysis

Several benefits result from root cause analysis. The most important benefit is that once a root cause is identified, its correction reduces the chance of the same deficiency recurring or similar or related deficiencies occurring. Also, because environmental deficiency usually shares some of the same root causes as other deficiencies, identifying, understanding, and correcting a root cause could result in minimizing or eliminating other deficiencies, as well. The result of such nonrecurrence is fewer or no enforcement actions and fewer manpower resources needed for correcting a deficiency.

Other benefits are:

- o improved management efficiency and effectiveness,
- o help in prioritizing actions for correcting deficiencies,
- o specific documentation and justification for deficiency-related management decisions, and
- o cost reduction or avoidance.

Summary

The Services' environmental compliance assessment programs identify the regulatory deficiencies that installations must correct to obtain or maintain compliance. However, compliance evaluators and installation managers often give little or no attention to the factors that cause the deficiencies. Those factors have not been identified and corrected because the root cause analysis methodology needed to assure analytical integrity and comparability are not in place; the Services lack policy requiring oversight, reporting, tracking and followup of root cause analysis results; and the Services are not conducting training on how to conduct effective root cause analysis.

If causal factors for deficiencies are not specifically identified and corrected, the same deficiencies frequently recur. Repeat deficiencies represent undeniable evidence of systemic problems in the environmental compliance assessment programs. Root cause analysis serves as a tool to identify the basic causes for the occurrence of an environmental compliance deficiency. Reducing or eliminating future deficiencies depends upon identifying the root cause and initiating corrective measures. Until the true root cause of a deficiency is

identified, understood, and eliminated, the deficiency could continue to recur. Adopting a root cause analysis methodology will take the DoD compliance program to the next step towards reducing compliance enforcement actions.

Recommendations, Management Comments and Evaluation Response

Added Recommendation. Based on management comments we added recommendation 1.c below.

1. We recommend that the Deputy Under Secretary of Defense (Environmental Security):

a. Establish a working group to select a standard root cause analysis methodology for adoption by the Services.

b. Require the working group to consider those methods described in Appendixes E and G.

c. Incorporate the selected methodology into DoD guidance.

Deputy Assistant Secretary of Defense (Environmental Security) Comments. The Deputy Under Secretary of Defense (Environmental Security) concurred with the finding and Recommendations 1.a. and 1.b. The Deputy stated this report is timely and helpful and has initiated activities to identify a root cause analysis methodology.

The Assistant Secretary of the Navy (Installations and Environment) Comments. Although not required to comment on this recommendation, the Navy stated that it is premature to ascertain whether a standard root cause methodology would be appropriate. The working group being formed should make the determination.

Evaluation Response. A methodology that is compatible to one Service would be compatible to the other Services. Using the same methodology provides uniformity across the Services. Uniformity is paramount for identifying, tracking, and correcting root causes. The root causes identified for compliance discrepancies are the same, tracking and followup of those root causes will be compatible, and the necessary training for those performing the root cause analysis will be consistent across the Services. Recommendation 1.c. was added after the draft report was published. We request the Deputy Under Secretary of Defense (Environmental Security) to consider Recommendation 1.c. that was added and to provide additional comments in its response to the final report.

2. We recommend that the Assistant Secretary of the Army (Installations, Logistics, and Environment), the Assistant Secretary of the Navy (Installations and Environment), the Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health), and the Commandant of the Marine Corps Deputy Chief of Staff for Installations and Logistics incorporate in-depth root cause analysis of environmental compliance deficiencies in their environmental compliance assessment programs. Specifically, the Services should:

a. Issue policy requiring oversight, reporting, tracking, and followup of root cause analysis results.

b. Conduct appropriate training on how to conduct effective root cause analysis.

Army, Navy, and Air Force Comments. The Army, the Navy, and the Air Force concurred with this recommendation and have initiated steps to incorporate detailed root cause analysis into their compliance assessment programs.

Part II - Additional Information

Appendix A. Scope and Methodology

Analysis of Results of the EPA Federal Facilities Multi-Media Enforcement/Compliance Initiative

To understand the effectiveness of DoD environmental compliance assessment programs, we examined the results of a year-long compliance inspection published by the Environmental Protection Agency (EPA). The EPA conducted the FY 1994 Federal Facilities Multi-Media Enforcement/Compliance Initiative (FMECI). Recognizing that Federal facilities are a highly visible sector of the regulated community and have historically demonstrated lower rates of compliance with environmental laws than their private sector counterparts, the EPA designed the initiative to assess the compliance status of Federal facilities with environmental laws. To do so, the EPA used a multi-media approach. In a multi-media inspection, a multidisciplinary team of inspectors coordinates its examination of the installations' compliance with various laws and regulations (for example, the Clean Water Act, the Clean Air Act, the Resource Conservation and Recovery Act, and the Toxic Substances and Control Act) pertaining to several media (for example, air, water, and land).

We compiled a list of deficiencies identified in the draft or final assessment reports for each of the 26 DoD installations inspected in the FY 1994 FMECI.

The table on the next page lists the DoD installations inspected during FY 1994.

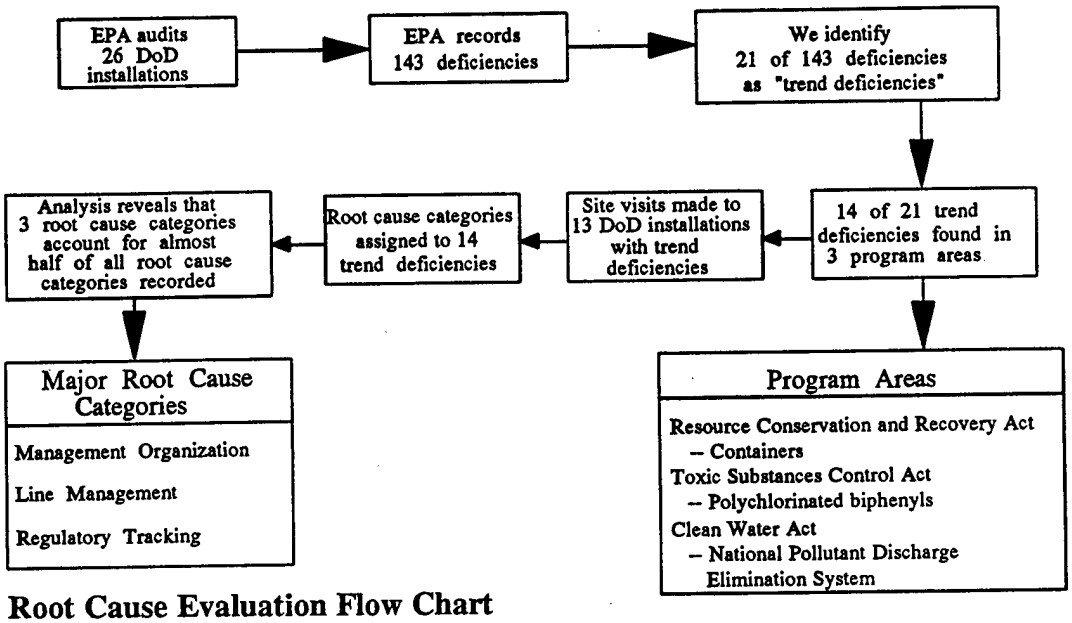
DoD Installations Inspected in the EPA FY 1994 Federal Facilities Multi-Media Enforcement/Compliance Initiative

Service	Installation
Army	Bayonne Military Ocean Terminal, New Jersey
	Fort Belvoir, Virginia*
	Fort Bliss, Texas*
	Fort Jackson, South Carolina*
	Fort Lewis, Washington*
	Fort Rucker, Alabama
	Fort Stewart, Georgia*
	Hunter Army Air Field, Georgia*
	Iowa Army Ammunition Plant, Iowa*
	Lima Army Tank Plant, Ohio*
	Natick Research, Development and Engineering Center, Maine*
	Presidio of San Francisco, California
	Schofield Barracks, Hawaii
	Tooele Army Depot, Utah
Navy	Cutler Naval Computer and Telecommunications Station, Maine*
	Indian Head Naval Surface Warfare Center, Maryland*
	Naval Surface Warfare Center, Rhode Island
	Pensacola Naval Air Station, Florida
	Panama City Naval Coastal Systems Station, Florida
	Winter Harbor Naval Security Group, Maine*
Air Force	Davis Monthan Air Force Base, Arizona*
	Eielson Air Force Base, Alaska*
	Keesler Air Force Base, Mississippi
	Plattsburgh Air Force Base, Florida
	Tyndall Air Force Base, Florida
	Vermont Air National Guard, Vermont

* Indicates installations visited during our evaluation.

Our analysis of the results shows 143 different deficiencies occurred in the 26 DoD installations. Twenty-one different deficiencies occurred at 6 or more of the 26 installations. We refer to those 21 deficiencies as trend deficiencies. Of the 21 trend deficiencies, 14 fell into three distinct categories. Those categories related to regulations for hazardous waste containers under the Resource Conservation and Recovery Act, polychlorinated biphenyls under the Toxic Substances and Control Act, and National Pollutant Discharge Elimination System discharges under the Clean Water Act.

The chart below is a flow chart reflecting how we conducted this evaluation.



Root Cause Evaluation Flow Chart

Site Visits and Interviews

We visited 13 of the 26 DoD installations inspected in the FY 1994 FMECI where three or more of the trend deficiencies related to hazardous waste containers, polychlorinated biphenyls, and/or National Pollutant Discharge Elimination System discharge had been identified. During each site visit, we interviewed the environmental manager, the next higher level supervisor, and the facility commander or his representative. We used questionnaires to gather information about the installation's environmental program, organization, and managerial processes (for example, self-assessments and other internal assessments). Based on discussions with installation personnel and our checklist of root causes, we determined and assigned root causes for each trend deficiency. See Appendix I for a list of root causes arranged by category (for example, relating to management organization, line management, or regulatory tracking). Our checklist was developed using information from various sources that had experience in root cause analysis (for example, the Department of Energy, the Air Force, and the Army).

In addition to interviewing personnel at DoD facilities, we interviewed representatives of six major commands across the Services to get information on their environmental compliance policies, environmental compliance assessment programs, and the associated requirements for costs and other resources. We also interviewed representatives of the Defense Environmental Security Corporate Information Management Office to learn about the Compliance

Deficiency Management Module. This module is a computer program to be used by installation-level and command-level environmental compliance program managers to automate the collection and reporting of information on environmental compliance deficiencies.

Other Organizations Visited. To understand how the EPA and State regulators accomplish their inspection and enforcement roles and carry out the FY 1994 Multi-Media Initiative, we interviewed representatives from the Office of Enforcement and Compliance Assurance at EPA headquarters; the Federal Facility Coordinators in EPA Regions I, IV and X; and representatives from the States of Maine, Washington, Maryland, Virginia, Georgia, and South Carolina. We selected the EPA regions and states based on proximity to the DoD facilities we visited. We also reviewed the EPA Interim National Report on the FMECI, dated November 1994, for the results of the preliminary analysis and enforcement highlights from the multi-media inspections conducted during FY 1993.

We learned about the trends and developments in environmental auditing by conducting a literature review and interviewing representatives from the Department of Energy, the EPA, and private industry organizations that had progressive environmental auditing programs. We studied information from various organizations working to develop guidelines on environmental management, including the International Organization for Standardization (ISO) 14000 Technical Committee 207 and the Global Environmental Management Initiative. A followup report will evaluate environmental management systems within DoD.

Evaluation Period, Standards, and Locations. This evaluation was made from January 1995 through May 1996 in accordance with standards implemented by the Inspector General, DoD. The evaluation did not rely on computer-processed data or statistical sampling procedures. Appendix J lists the organizations visited or contacted during the evaluation.

Appendix B. Summary of Prior Audits and Other Reviews

During the last 5 years, the General Accounting Office (GAO) and the Inspector General, DoD, each issued a report that specifically discussed the DoD environmental compliance assessment programs.

General Accounting Office

In GAO Report No. RCED-95-37 (OSD Case No. 9835) "Environmental Auditing: A Useful Tool That Can Improve Environmental Performance and Reduce Costs," April 3, 1995, GAO examined various Federal agencies' environmental compliance auditing programs, including the Air Force Environmental Compliance Assessment Management Program. The GAO acknowledged significant progress made by the DoD toward developing effective environmental audit programs and acknowledged that the Air Force has implemented a comprehensive environmental audit program and has embraced environmental auditing as a way to avoid creating new environmental problems and to ensure compliance with environmental requirements. The principal findings were that environmental auditing among Federal agencies is limited and that agencies face obstacles in developing environmental audit programs. Report recommendations were addressed to the Environmental Protection Agency regarding enforcement attention and technical assistance and outreach to civilian Federal agencies. The DoD and the Air Force agreed generally with GAO findings and recommendations.

Inspector General, DoD

In Inspector General, DoD, Report No. 92-011, "Environmental Compliance Assessment Programs," November 8, 1991, the Inspector General, DoD, states that DoD environmental compliance assessment programs were not fully implemented or effective overall. Eight of the sixteen installations reviewed had not completed internal assessments. In addition, the assessments that were completed did not ensure that noncompliance conditions would be identified and corrected. As a result, DoD installations had not identified the scope of their environmental problems and were exposed to costly operational, regulatory, and legal actions. In the report, the Office of the Inspector General, DoD, recommended that the Office of the Secretary of Defense establish the environmental compliance assessment program through

regulatory guidance and that DoD Components provide appropriate staffing to implement the program and maintain adequate program visibility and oversight. As a result of that audit and management attention, DoD Components strengthened their programs.

Appendix C. Elements of Environmental Compliance Assessment Program

EPA 1986 Environmental Auditing Policy Statement

The Environmental Protection Agency Environmental Auditing Policy Statement, issued July 9, 1986, identified performance-oriented "Elements of Effective Environmental Auditing Programs." Those elements are listed and described here.

o Explicit top management support for environmental auditing and commitment to follow up on audit findings.

Management support may be demonstrated by a written policy citing upper management support for the auditing program, to include compliance with all pertinent requirements, including permits and Federal, State, and local statutes and regulations. The written policy would include a commitment to follow up on audit findings to correct identified problems and prevent their recurrence.

o An environmental auditing function independent of the audited activities.

The status or organizational placement of environmental auditors should be sufficient to ensure objective and unobstructed inquiry, observation, and testing.

o Adequate team staffing and training.

Environmental auditors should possess or have ready access to the knowledge, skills, and disciplines needed to accomplish audit objectives. Auditors should maintain their technical and analytical competence through continuing education and training.

o Explicit audit program objectives, scope, resources, and frequency.

At a minimum, audit objectives should include assessing compliance with applicable environmental laws and evaluating the adequacy of internal compliance policies, procedures, and personnel training programs to ensure continued compliance.

Audits should be based on a process that provides auditors with access to all policies; permits; and Federal, State, and local regulations pertinent to the facility, as well as checklists or protocols addressing specific characteristics that should be evaluated by auditors.

Explicit written audit procedures should be used for planning audits, establishing audit scope, examining and evaluating audit findings, communicating audit results, and following up.

o A process [that] collects, analyzes, interprets, and documents information sufficient to achieve audit objectives.

Information should be collected before and during an on-site visit regarding environmental compliance, environmental management effectiveness, and other matters related to audit objectives and scope. The information should be sufficient, reliable, relevant, and useful to provide a sound basis for audit findings and recommendations.

o Specific procedures to promptly prepare unbiased, clear, and pertinent written reports on audit findings, corrective actions, and schedules for implementation.

Procedures should be in place to ensure that such information is communicated to managers, including facility and higher command management, who can evaluate the information and ensure correction of identified problems. Procedures should also be in place for determining what internal findings are reportable to State or Federal agencies.

o Adequate procedures to ensure the quality, accuracy, and thoroughness of environmental audits.

Quality assurance may be accomplished through supervision, independent internal reviews, external reviews, or a combination of those approaches.

Inspector General, DoD, Rating Factor Index

For its 1991 report on environmental compliance assessment programs, the Office of the Inspector General, DoD, categorized the EPA-defined elements of an effective environmental compliance assessment program into five rating factors. Relative weights were assigned to each rating factor by its functional importance and its overall impact on ensuring environmental compliance.

The five rating factors of the Inspector General, DoD rating factor index are discussed in the following paragraphs:

Planning. Planning means that each assessment team should adequately define the objectives, scope, and resources at the beginning of each assessment. (Relative weight: 5 percent)

Staffing. Staffing means that team members should be knowledgeable of applicable environmental laws, regulations, and operations of the facilities reviewed. (Relative weight: 10 percent)

Execution. For execution, the team should have a process to collect, analyze, interpret, and document information for performing a comprehensive assessment of the installation's environmental practices. (Relative weight: 25 percent)

Reporting. To ensure adequate reporting, the installation and major command should establish procedures for formal presentation and reporting deficiencies and proposing solutions to management. (Relative weight: 25 percent)

Followup. Ensuring adequate followup by installations should involve establishing procedures to document and report corrective actions taken in the assessment report. (Relative weight: 35 percent)

Appendix D. Characteristics of the DoD Environmental Compliance Assessment Programs

Office of the Secretary of Defense

In response to Executive Order 12088, "Federal Compliance with Pollution Control Standards," issued in October 1978, and anticipating the EPA 1986 "Environmental Auditing Policy Statement," DoD issued an interim policy memorandum, "Environmental Audits of Department of Defense Facilities," January 17, 1985. Since then, the Office of the Deputy Under Secretary of Defense (Environmental Security) (DUSD[ES]) has been working on an "umbrella" directive, DoD Directive 4715.XX, "Environmental Security," and accompanying instructions that should describe specifics of an environmental compliance assessment program.

Policy guidance, procedures, and protocols for environmental compliance assessments have been issued by the Services and are periodically revised. Depending on the Service, major command assessments are conducted at least every 3 or 4 years. To provide for objective assessments, individuals who are independent of the installation undergoing the assessment comprise the major command assessment teams. Representatives from the major command, environmental support organizations (for example, Army Environmental Center, Naval Facilities Engineering Command Engineering Field Divisions, and the Air Force Center for Environmental Excellence), and in some cases, from consulting firms and other installations participate in week-long assessments and produce reports with findings and recommendations for corrective actions. In addition to major command assessments, each Service requires the installation to conduct periodic self-assessments. Installations prepare and implement followup corrective action plans. Each Service monitors the progress of its installations in working those plans. The DoD environmental compliance assessment program resulted in 44 percent fewer enforcement actions from FYs 1994 to 1995.

Table D-1, on the next two pages, compares the characteristics of the Services' environmental compliance assessment programs. Acronyms and abbreviations not explained in Table D-1 are provided in Table D-2.

Table D-1. Comparison of Services' Environmental Compliance Assessment Programs

Service	Army	Navy	Air Force	Marine Corps
Program Name	ECAS (Environmental Compliance Assessment System)	ECE (Environmental Compliance Evaluation Program)	ECAMP (Environmental Compliance Assessment Management Program)	ECE (Environmental Compliance Evaluation Program)
Program Guidance	AR 200-1, Env. Protection & Enhancement, 4/23/90 TEAM Guide, 11/94 The Active Army Supplement for TEAM Guide, 5/95	OPNAVINST 5090.1B, Env. & Nat. Resource Program Manual, 11/1/94 ECE Protocols	AFPD 32-70, Env. Quality, 7/20/94 AFI 32-7045, ECAMP 4/5/94 The Environmental Assessment& Management (TEAM) Guide, 11/94 Air Force ECAMP Supplement, 1/95	MCO 5090.2, Env. Compliance & Protection Manual, 9/26/91 Automated Compliance Evaluation Checklist System
Self Assessment Required	at least every 2 years	annually (Tier 1)	annually	annually (sponsored by HQMC)
HQ/MACOM Assessment Schedule	at least every 4 years	every 3 years (Tier 2)	every 3 years	every 2 years
Other Assessments	none	Navy Inspector General Inspection focuses on specific environmental issue (Tier 3)	every 3 years	Baseline/Benchmark ECE by contractor, sponsored by HQMC Self ECE for POA&M followup Marine Corps Inspector General triennial inspections

Table D-1. Comparison of Services' Environmental Compliance Assessment Programs (cont'd)

Service	Army	Navy	Air Force	Marine Corps
Assessment Objective	Primarily Compliance Limited experience w/ management systems	Primarily Compliance Limited experience w/ management systems	Primarily Compliance Limited experience w/ management systems and risk assessments	Primarily Compliance
Root Cause Analysis	Limited	Limited	Limited	No
Followup/Corrective Action Plan Required	ICAP	POA&M	Management Action Plans	POA&M
Resources Used by HQ/MACOM to Conduct Assessments	Army Env. Center U.S. Army Environmental Hygiene Agency U.S. Army Corps of Engineers HQ and Installation personnel	Naval Facilities Engineering Command's Engineering Field Divisions/Activities HQ and Installation personnel	Air Force Center for Environmental Excellence Air Force Regional Compliance Office HQ and installation personnel Contractor personnel	Naval Facilities Engineering Command's Engineering Field Divisions/Activities Contractor personnel HQ personnel
Duration/Resources to Conduct HQ/MACOM Assessment	averages 10 days (5 days for AMC) 425 manhours	averages 5 days 830 man-hours	averages 5 days 960 man-hours	averages 10 days 800 man-hours
Number of HQ/MACOM Assessments Conducted in FY 1994	31	69	125	8
Cost per HQ/MACOM Assessment	$103,000	$33,400	$49,600	$45,000
FY 1994 Cost of Conducting HQ/MACOM Assessments	$3,198,400	$2,302,000	$6,199,000	$360,000

Table D-2. Acronyms and Abbreviations

AMC	Army Material Command
AFPD	Air Force Policy Directive
AR	Army Regulation
Env.	Environmental
HQ	Headquarters
HQMC	Headquarters Marine Corps
ICAP	Installation Corrective Action Plan
MCO	Marine Corps Order
MACOM	Major Command
Nat.	Natural
OPNAVINST	Chief of Naval Operations Instruction
POA&M	Plan of Action and Milestones
w/	with

Department of the Army

The Army assesses environmental compliance at its installations through external and internal assessments. External assessments are conducted through the Environmental Compliance Assessment System (ECAS) in the Army and through the Environmental Review Guide for Operations in U.S. Army Corps of Engineers Civil Works operations. Both programs are intended to provide installations and their major commands an independent, objective evaluation of the installation's environmental needs.

Since 1985, Army major commands have been required to conduct comprehensive environmental assessments at all installations on a 4-year cycle. Each installation must also conduct a mid-cycle internal assessment. Because each major command was developing a separate assessment system, the Army mandated, through Army Regulation 200-1, "Environmental Protection and Enhancement," one unified Army-wide assessment mechanism. The resulting system combines Federal, DoD, and Army regulations, along with good management practices and risk-management information, into a series of checklists that show legal requirements and specific items or operations to review. The Army uses The Environmental Assessment and Management (TEAM) Guide and its supplements developed by the U.S. Army Corps of Engineers Construction Engineering Research Laboratories for all assessments within the United States and its jurisdictions. The Army also uses supplements to the TEAM guide for the three components (the active component, the U.S. Army Reserve, and the U.S. Army National Guard) and for State protocol manuals.

Army installations must develop and maintain a management and funding plan, called the Installation Corrective Action Plan for the Active Army, in response to external assessments and regulatory agency inspections. That plan is used to ensure that corrective actions are implemented and to avoid increasing environmental compliance liability.

The Army uses internal assessments to build upon information gathered in the external assessment (the ECAS) and to meet its own environmental management information needs. Internal assessments may also be used to follow up on corrective actions from the external assessment and to assess the compliance of activities and operations that were not assessed in the external assessment.

The Army has drafted a revision to Army Regulation 200-1 that will require external assessments to be conducted on a 3-year cycle, as a minimum, and internal assessments to be conducted annually.

Department of the Navy

The Department of the Navy outlines procedures and responsibilities to monitor, achieve, and maintain environmental compliance ashore, primarily through the Environmental Compliance Evaluation (ECE) Program in Chapter 20 of the Chief of Naval Operations Instruction 5090.1B. The three tiers of the ECE program are activity self ECE; major-claimant-conducted ECE; and Navy Inspector General environmental compliance inspections. Each shore activity is to conduct a self ECE annually. The major claimant performs the Tier 2 ECE at a shore activity at least every 3 years. The Navy Inspector General inspections generally focus on specific environmental issues.

The Naval Facilities Engineering Command maintains and updates a standard checklist that addresses Federal, State, and local environmental and natural resources requirements. The Naval Facilities Engineering Command Engineering Field Divisions and Engineering Field Activities also provide ECE guidance, training, and support to the major claimants on request.

Department of the Air Force

The Department of the Air Force has established a comprehensive self-assessment and program management system to assist the Air Force in attaining and maintaining full compliance with Federal, State, local, DoD, and Air Force environmental laws and regulations. The Environmental Compliance Assessment and Management Program (ECAMP) is a process to help commanders assess the status of environmental compliance and to identify and track solutions to compliance problems through the use of environmental compliance assessments and management action plans. The primary objectives of ECAMP are to improve Air Force environmental compliance and management worldwide and to build supporting financial programs and budgets for environmental compliance requirements.

Air Force Instruction 32-7045 on ECAMP requires team members to identify findings (conditions clearly in noncompliance with criteria) and also encourages team members to provide additional information, including background

information, statements on causes and effects, and recommendations aimed at resolving root causes to correct the deficiency. For each finding of noncompliance, team members must identify the applicable finding category code (that is, significant, major, or minor) and applicable violation-type codes (that is, related to discharge, potential discharge, or administrative). The purpose of the codes is to improve and simplify tracking and identification of Air Force-wide environmental problems and to improve program management.

U.S. Marine Corps

In Chapter 4 of the Marine Corps Order P5090.2, "Environmental Compliance and Protection Manual," the U.S. Marine Corps outlines procedures and responsibilities for ensuring environmental compliance at Marine Corps installations. The Marine Corps ECE, based on the Navy three-tier program, provides a means to monitor, achieve, and maintain compliance with environmental regulations. The program is intended to verify that environmental program management practices are in place, functional, and adequate; identify actual and potential areas of noncompliance, or areas likely to be in noncompliance as a result of projected statutory or regulatory changes; and recommend corrective actions for achieving compliance.

The Marine Corp is currently drafting a revision to Marine Corps Order P5090.2, including a response to the chapter on ECEs.

Services' Joint Efforts

Since 1984, the U.S. Army Construction Engineering Research Laboratories, in cooperation with DoD components, has developed environmental compliance assessment checklist manuals. The Environmental Assessment and Management (TEAM) Guide was developed for use by all DoD components. Currently, seven components are participating, including the Air Force, the Air Force National Guard, the Army, the Army National Guard, the Army Reserve, the Army Civil Works, and the Defense Logistics Agency. Those organizations have agreed to share the development and maintenance of that guide.

As a result of the "Defense Management Review Decision 920," December 31, 1991, the DoD established the Corporate Information Management System. The purpose is to eliminate redundant information management systems and improve business processes. One of the modules being fielded as part of the Defense Environmental Security Corporate Information Management System is the Compliance Deficiency Management Module. The Compliance Deficiency Management Module is a personal computer program to be used by installation-level and command-level environmental compliance managers. It automates the

collection and reporting of information on environmental compliance deficiencies. The Compliance Deficiency Management Module tracks compliance deficiencies on multiple installations and allows each installation to track deficiencies by the organizational unit where the deficiency was found.

The Compliance Deficiency Management Module can track the following information:

o results of self-assessments, major command assessments, and regulatory agencies inspections;

o notifications including enforcement actions (for example, notices of violation, notices of noncompliance);

o fines; and

o compliance agreements.

Details on findings and corrective actions can also be captured including media, degree of severity, violation category, discovery date, repeat instances, installation points of contact, responsible organizations, descriptions of tasks to complete corrective actions, estimated completion date, actual completion date, and other related information.

Appendix E. Root Cause Analysis Methods*

Events and Causal Factor Analysis

Events and Causal Factor Analysis is best for multi-faceted problems having complex causal factor chains. This method provides a visual display of the analysis process and identifies the probable contributors to the condition. It is time-consuming and requires familiarity with the process to be effective. A broad perspective of the event is required to identify unrelated problems.

Change Analysis

Change Analysis should be used when the cause is obscure. This method is useful in evaluating equipment failures. The Change Analysis method uses a six-step process. The steps are identify occurrence with undesirable consequences, examine comparable activity that occurred without undesirable consequence, compare, set down differences, analyze differences, and integrate information into process. Flaws of that method include the possibility of identifying a wrong answer and not identifying all root causes. It is a technique that can be used to support a larger, more complex analysis.

Barrier Analysis

Barrier Analysis is a systematic process that can be used to identify physical, administrative, and procedural controls that should have prevented the discrepancy. Using that method requires the analyst to be familiar with the process. Barrier analysis will identify why a discrepancy occurred and what is needed to prevent recurrence.

*Extracted from Department of Energy Guideline DOE-NE-STD-1004-92.

Management Oversight and Risk Tree Analysis

A Management Oversight and Risk Tree Analysis can be used whenever the deficiency is a recurring one. This method is helpful in solving programmatic problems and when there is a shortage of experts and personnel have had limited prior training. The possibility exists that this method will only identify a general cause of the deficiency and not specific root causes.

Human Performance Evaluation

Human Performance Evaluation should be used when people have been involved in the cause of the deficiency. If the process is followed precisely, this method has no disadvantages. However, analysts using Human Performance Evaluation should have formal training.

Appendix F. Army Root Cause Codes

The Army uses the following codes in its Environmental Compliance Assessment System (ECAS) software to identify the causes for the occurrence of a noted deficiency.

Materials

M1 Supply
M2 Poor quality

Personnel

P1 Awareness of requirement
P2 Understanding
P3 Not conscientious (deals with personnel attitude)
P4 Result versus action (result not equal to action)
P5 Accountability not assigned
P6 Action versus procedure (correct procedure, incorrect action)
P7 Insufficient skills
P8 Inexperience (not an attitude of personnel)

Equipment

E1 Controls failure
E2 Inadequate facility design
E3 Monitoring equipment failure
E4 Poor maintenance

Techniques

T1 Time to do the job
T2 No procedures in place
T3 Priority conflict
T4 Inadequate procedures
T5 Procedures not available

Appendix G. TEXACO, Inc., Root Cause Analysis

TEXACO, Inc., is one of many organizations that have adopted an exemplary root cause analysis. TEXACO developed the following root cause analysis methodology for use in auditing and managing its own environmental compliance programs throughout its corporate world.

The methodology requires a specific sequence of considerations on the part of the auditor in arriving at the selection of a root cause. Two root cause categories (insufficient resources and organization or overall management deficiencies) are not included in the accompanying root cause analysis procedures. A TEXACO representative informed us that those root causes are definitely considered in carrying out the analysis and that, when applicable, they are reported separately from the report for corporate policy reasons. The root cause analysis process that TEXACO uses is described in the article "Developing Recommendations to Address Root Causes of Findings," published in *Environmental Auditing*, published by John Wiley & Sons, Inc., August 1993. The following is that process extracted from the article and modified for this report.

Introduction

This "tool" is a procedure intended to assist the environmental auditor and audit team leader in the field to:

o consistently define the root cause of findings and

o identify any programmatic and overall findings that indicate a need for management programs to ensure ongoing compliance at the facility.

The analysis of audit reports and root cause matrixes within operating departments will also allow identification of broad-based problems. Analysis of findings and root causes at a department level enhances the corrective action process and allows the department to prevent problems from occurring at other facilities. This enhancement increases the value and effectiveness of the audits, provides a practical method for evaluating performance, and allows improvements in performance to be tracked.

Auditor Activities

Every finding has at least one root cause. The environmental auditor is responsible for identifying the root cause of each finding and addressing it in the recommendation. The auditor's job is not complete unless and until that is done effectively.

In TEXACO's root cause analysis methodology the auditor has to complete four steps:

- o defining the root cause,
- o addressing root causes in recommendations,
- o classifying findings by root cause category, and
- o discussing results with the team leader.

Defining the Root Causes. After the auditor identifies a finding, the auditor should determine why the finding occurred, that is, the underlying cause that needs to be improved or changed to effectively prevent a recurrence of the problem. Often that can be determined by reviewing the facts already known to the auditor. At other times, it may be necessary to gather additional information.

Sometimes the best way to gather that information is to discuss the finding with the facility person most familiar with the issue. During the discussion, the auditor should tactfully inquire about the cause of the failure or what would need to change so that the problem is not repeated in the future. The auditor should avoid putting the facility person on the defensive or placing blame; the more positive approach of focusing on prevention is suggested. By working cooperatively with the facility person, the auditor should be able to define the root causes.

At times there may be two or three causes of the problem; at other times, insufficient information will be available to establish the root cause with certainty.

Having identified the root causes, the auditor should address each root cause in a recommendation, use the root cause matrix to classify each finding according to underlying cause, and present the completed root cause matrix to the team leader and discuss the basis for each root cause determination. A copy of the TEXACO root cause matrix is provided on the following page.

Root Cause Matrix

CATEGORY: AIR, WATER, WASTE, OTHER

Facility _____ Auditor _____ Date _____

FINDING	Knowledge of the issue	Develop or modify procedures	Implement procedures	Train personnel	Document results	Oversee execution

To ensure the auditor has sufficient time during the audit to complete that task, the auditor must use sampling effectively, manage the available time efficiently during the audit, avoid the temptation to spend too much time doing physical inspection, identify potential exceptions early in the audit, and leave extra time prior to the closing conference for the additional work needed by the team leader to review the root causes and develop any programmatic and overall findings.

Addressing Root Causes in Recommendations. The root cause is explained by the "because statement" in brackets and would not normally be included in the problem statement. For example, a hazardous waste drum was not labeled with the words "hazardous waste" [because a new individual was assigned labeling responsibilities and was not instructed on proper labeling requirements]. Note the format of the recommendation that addresses both the identified problem and the root cause.

Classifying Findings by Root Cause Category. Before the closing conference, the auditor should evaluate each finding with respect to the following six broad categories of root causes. The categories illustrate a progression from the most fundamental cause to the most detailed from left to right across the root cause matrix. In some cases, that progression may not hold true. For example, lack of training of personnel could be the most fundamental cause if it resulted in failure to identify the issue.

The categories are:

- **Gain knowledge of the issue.**

The facility is not aware of or has wrongly interpreted the applicability of the requirement, and, therefore, has not taken the minimum steps required to manage the issue. The absence of needed pollution control equipment (for example, an oil/water separator) is included in that category.

- **Develop or modify procedures.**

Although the facility has identified the issue, it has not fully developed systematic and comprehensive procedures needed to effectively manage the issue. The absence of inspection procedures intended to be the primary data gathering or control mechanics is included in that category.

- **Implement procedures.**

Although the facility has developed effective procedures, it has not deployed them completely or implemented them properly.

- **Train personnel.**

Although the facility has developed and promulgated effective procedures, it has not properly trained personnel who are responsible for carrying out the procedures.

- **Document results.**

Although the facility has developed and promulgated effective procedures and has trained personnel, it does not have adequate records to verify requirements are satisfied.

- **Oversee execution.**

Although the facility has developed and promulgated effective procedures, has adequately trained personnel, and has adequate records to verify satisfaction of requirements, errors in execution or inconsistencies in oversight occur that reduce performance. The absence of inspection procedures intended to be a secondary control mechanism (that is, checking the checker) is included in that category.

The auditor should group the findings by topic (for example, Spill Prevention Control and Countermeasure, National Pollutant Discharge Elimination System) on a root cause matrix (in pencil) noting the category of root causes. The auditor should note only the most fundamental one or two root causes. For example, if lack of procedures is identified to be the true root cause, implementation of procedures and need for training should not be checked in the matrix, although they may be included in the recommendation. A separate root cause matrix should be used for each category (air, water, waste, and other) and for each auditable entity.

Discussion with Team Leader. The auditor should present the completed root cause matrix to the team leader prior to the closing conference and discuss the basis for each root cause determination. The auditor's responsibility for root cause evaluation is complete only after the team leader agrees with the determination and accepts the completed root cause matrix. A copy of the root cause matrix should be included in the team member's working papers.

Table H.1. Most Frequently Cited Root Cause Categories

This table shows the number of root cause elements recorded for the three most frequently cited categories spread among three program areas. The three root cause categories accounted for 44 percent of the total 290 elements cited.

Root Cause Categories	Programs			
	Containers	Polychlorinated biphenyls (PCBs)	National Pollutant Discharge Elimination System (NPDES)	Totals
Management Organization	21	2	12	**35**
Line Management	20	5	15	**40**
Regulatory Tracking	16	22	14	**52**
Totals	**57**	**29**	**41**	**127**

Table H.2. Root Cause Category Elements

(Number of Citations Per Root Cause Element)

Root Cause Category Elements	Containers	PCBs	NPDES	Totals
Management Organization				
Unclear lines of authority and responsibility.	3	--	2	5
Environmental management has too much responsibility to carry out work.	8	--	6	14
Lines of communication are unclear and undefined.	2	--	--	2
Environmental management lacks sufficient stature, independence and authority.	5	--	4	9
Structure not routinely reviewed and / or adjusted as needed.	--	--	--	--
Administrative control is inadequate.	3	2	--	5
Line Management				
Not all personnel recognize and understand the environmental aspects of their job.	13	--	2	15
Not all managers show commitment and responsibility for minimizing environmental impacts of their operations.	4	--	4	8
A work organization or planning deficiency exists.	3	1	4	8
Supervision is inadequate.	--	2	5	7
Resource allocation is improper.	--	2	--	2
Regulatory Tracking				
No system is in place to track new or changing regulations.	1	6	2	9
New regulatory requirements are not being incorporated into SOPs.	1	4	3	8
Field organizations are not being provided sufficient guidance on new regulations.	6	5	5	16
Regulation or policy is being misinterpreted.	8	7	4	19

Appendix I. Root Causes

This appendix lists the root cause categories and elements for each category that we used to identify reasons for the occurrence of trend deficiencies. We discussed each trend deficiency with staff at the sites we visited and identified one or more appropriate root cause element for each deficiency. This list is a modified version of root causes developed by the Department of Energy. This modified Department of Energy list consists of 24 root cause categories with numerous root cause elements under each.

Management Organization

o Authority and responsibility are unclear.

o Environmental management has too much responsibility to carry out work.

o Lines of communication are unclear and undefined.

o Environmental management lacks sufficient organizational stature, independence, and authority (that is, levels within organization).

o Structure is not routinely reviewed or adjusted as needed.

o Administrative control is inadequate.

Roles and Responsibility

o Responsibilities are not clearly defined, communicated, and understood by all activities.

o Job description, performance standards, and performance appraisals are lacking.

o Environmental and non-environmental staff are not held accountable for environmental performance.

Top Management Support

o Formal statements and policies for environmental goals and expectations are lacking.

o Commitment to environmental excellence is lacking.

o Routine reports on environmental status are not required.

o Basic understanding and appreciation for environmental requirements are lacking.

o Top management does not embrace openness or comments from employees or the public sector.

o Compliance, awareness, teamwork, and responsibility are not encouraged.

Policy

o Formal policy is not issued or not issued from a high enough level.

o Production is given priority over environmental protection.

o Compliance is not established as the minimum standard.

o Issue-specific policy is not established (for example, polychlorinated biphenyls, National Environmental Policy Act, hazardous waste).

o Policy is not disseminated, available, or clear.

Line Management

o Not all personnel recognize and understand the environmental aspects of their jobs.

o Not all managers show commitment and responsibility for minimizing environmental impacts of their operations.

o Work organization and planning are deficient.

o Supervision is inadequate.

o Resources are improperly allocated.

Plans

o Program plans are not prepared or updated.

Regulatory Tracking

o A system is not in place to track new or changing regulations.

o New regulatory requirements are not being incorporated into Standard Operating Procedures.

o Field organizations are not being provided with sufficient guidance on new regulations or policies.

o Regulations or policy is misinterpreted.

Procedures

o A formal process for reviewing, creating, updating, and approving new procedures is not in place.

o Procedures are not issued by the organizational level high enough to mandate implementation.

o Procedures are not part of a control system to allow access to personnel.

o Procedures are not developed for that specific environmental program.

o Procedures are defective or inadequate.

Facility Inspections

o An organized and documented inspection program does not exist.

o A followup system for exceptions noted during inspections does not exist.

Recordkeeping and Reporting

o A tracking system for key regulatory schedules (for example, permit renewals) does not exist.

o Compliance records (for example, inspection logs, measurement data) are not maintained.

o A document control system and record retention policy does not exist.

o A system for documenting and recordkeeping of environmental performance is lacking.

o A system for ensuring that reports required by Federal, State, or DoD are submitted in a timely manner is lacking.

o Status reports are not routinely submitted to the appropriate level for identifying concerns to higher levels of management.

o No formal mechanisms exist to investigate, report, correct, track, and monitor environmental problems and incidents.

Internal Communications

o Environmental information is not communicated through formal or informal means throughout the organization.

o No formal system exists to allow for anonymous communication to upper levels of management.

o Informal channels of internal communication are not encouraged.

o Little or no use is made of such things as newsletters, bulletin boards, and video tapes for reinforcing environmental awareness.

o Effective working relationships do not exist between headquarters and field staff or between field staff and line personnel.

o Employee concerns are not solicited, addressed, or documented.

External Communication

o The organization does not have a good working relationship with, nor does it cooperate fully and openly with, external oversight agencies.

o A program does not exist for communicating with external parties (for example, regulatory agencies, environmental groups, the local community).

o The organization lacks frequent, timely, and effective formal communications.

Staffing

o Staffing levels are not sufficient to achieve performance goals.

o Staffing for environmental protection activities is not provided in a timely manner.

o Personnel with environmental responsibility do not have relevant background and training.

o A system to identify short-term and long-term staffing requirements is lacking.

Job Descriptions and Performance Evaluations

o Appropriate job descriptions are not established.

o Performance standards do not include environmental responsibilities.

o Incentives and penalties are not awarded according to performance.

Training

o Training programs and requirements are not defined.

o Processes are not in place to identify and evaluate training needs for all personnel.

o The training program is not supported by appropriate training materials and qualified trainers.

o All levels of personnel (operators to lower, middle, and upper management) do not undergo some level of environmental awareness training.

o Environmental training is not included in new employee and contractor orientation training and is not available for temporary employees and visitors.

o Training activities are not documentable (not auditable, complete, or current).

o Periodic evaluations of the effectiveness of training programs are not formally documented.

o Training is not conducted.

o Personnel lack sufficient practice or hands-on experience.

o Training content is inadequate.

o Refresher training is insufficient.

o Training presentations or materials are inadequate.

Staff Development

o The organization does not provide career opportunities and advancements for the environmental staff.

o The environmental staff is not encouraged to acquire management and professional skills.

o Cross-functional training is not available.

Self-assessments and Appraisals

o Ongoing formal, written programs for internal audits and independent oversight are non-existent.

o A formal self-assessment program is not in place.

o Assessments or appraisals are not conducted by trained and qualified professionals.

o No formal written guidance exists for conducting assessments or appraisals.

o Budget planning and requests do not include support for a self-assessment program.

o Evaluations of the assessment program are not conducted.

Reports

o Assessment results are not documented or distributed to the appropriate levels of management.

o Corrective actions to address root causes of findings are not developed or implemented by line management.

o Corrective actions are not tracked.

o "Lessons learned" programs have not been established.

o Trending analysis is not conducted.

o Environmental protection performance indicators have not been established.

Planning and Budgeting

o Environmental planning does not include both short-term and long-term planning.

o Environmental planning is not afforded the same formality as other organizational functions.

o Environmental protection considerations are not included in planning for other organizational functions.

o Environmental issues are not represented at key strategic and operations planning meetings.

o Environmental protection does not receive equal consideration in the planning process to that given production.

o Commitment of funds for environment-related activities is not sufficient to serve the organization's environmental performance goals.

o Environmental protection is not an integral part of the budget and planning process.

o A lack of control and oversight, sufficient to meet environmental requirements, exists over purchased materials, equipment, and services supporting the environmental protection activities.

Risk Management

o A formal risk management program has not been established.

o Operations and activities are not periodically reviewed to identify or manage environmental risks.

Equipment/Material Problem

o Defective or failed part caused the deficiency.

o Defective or failed material caused the deficiency.

Personnel Error

o Work environment was inadequate.

o Details were not given attention.

o Requirements or procedures were violated.

o Other personnel errors caused the deficiency.

Design Problem

o Man-to-machine interface was inadequate.

o Design was inadequate or defective.

o An error occurred in equipment or material selection.

o Drawing, specification, or data error occurred.

External Phenomenon

- o Weather or ambient condition caused the deficiency.
- o Power failure caused the deficiency.
- o Fire or explosion caused the deficiency.
- o Theft, tampering, sabotage, or vandalism caused the deficiency.

Appendix J. Organizations Visited or Contacted

Office of the Secretary of Defense

Deputy Under Secretary of Defense (Environmental Security), Arlington, VA

Department of the Army

Forces Command, Fort McPherson, GA
Training and Doctrine Command, Fort Monroe, VA
Army Environmental Center, Aberdeen Proving Ground, MD
Army Center for Health Promotion and Preventative Medicine, Aberdeen Proving Ground, MD
Fort Belvoir, VA
Fort Bliss, TX
Fort Jackson, SC
Fort Lewis, WA
Fort Stewart, GA
Hunter Army Air Field, GA
Iowa Army Ammunition Plant, IA
Lima Army Tank Plant, OH

Department of the Navy

Deputy Chief of Naval Operations, Environmental Protection, Safety, and Occupational Health, N-45, Arlington, VA
Headquarters, Naval Computer and Telecommunications Command, Washington, DC
Cutler Naval Computer and Telecommunications Station, ME
Headquarters, Naval Security Group Command, Washington, DC
Winter Harbor Naval Security Group, ME
Naval Sea Systems Command, Arlington, VA
Indian Head Naval Surface Warfare Center, MD

Department of the Air Force

Air Staff Office of the Civil Engineer, Arlington, VA
Davis Monthan Air Force Base, AZ
Eielson Air Force Base, AK

U.S. Marine Corps

Headquarters, U.S. Marine Corps, Arlington, VA

Non-Defense Federal Organizations

Office of Environmental Audit, U.S. Department of Energy, Washington, DC
U.S. Environmental Protection Agency
- Headquarters, Office of Federal Facilities Enforcement, Washington, DC
- Region I, Boston, MA
- Region IV, Atlanta, GA
- Region X, Seattle, WA
- National Enforcement Investigations Center, Denver, CO

State Organizations

Environmental Protection Office, State of Georgia, Atlanta, GA
Bureau of Hazardous Materials and Solid Waste Control, State of Maine, Augusta, ME
Department of the Environment, State of Maryland, Baltimore, MD
Department of Health and Environmental Control, State of South Carolina, Columbia, SC
Department of Environmental Quality, Commonwealth of Virginia, Richmond, VA
Department of Ecology, State of Washington, Olympia, WA

Appendix K. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense (Comptroller)
  Deputy Chief Financial Officer
  Deputy Comptroller (Program/Budget)
Deputy Under Secretary of Defense (Environmental Security)
Assistant to the Secretary of Defense (Public Affairs)
Director, Logistics Studies Information Exchange

Department of the Army

Assistant Secretary of the Army (Installations, Logistics, and Environment)
Auditor General, Department of the Army

Department of the Navy

Commandant of the Marine Corps
  Deputy Chief of Staff for Installations and Logistics
Assistant Secretary of the Navy (Financial Management and Comptroller)
Assistant Secretary of the Navy (Installations and Environment)
  Deputy Assistant Secretary of the Navy (Environment and Safety)
Auditor General, Department of the Navy

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)
Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health)
Auditor General, Department of the Air Force

Other Defense Organizations

Director, Defense Contract Audit Agency
Director, Defense Logistics Agency
Director, National Security Agency
  Inspector General, National Security Agency

Non-Defense Federal Organizations and Individuals

Office of Federal Facilities Enforcement, United States Environmental Protection Agency
Office of Management and Budget
Technical Information Center, National Security and International Affairs Division, General Accounting Office

Chairman and ranking minority member of each of the following congressional committees and subcommittees:

Senate Committee on Appropriations
Senate Subcommittee on Defense, Committee on Appropriations
Senate Committee on Armed Services
Senate Committee on Environment and Public Works
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
House Committee on Commerce
House Subcommittee on Health and Environment, Committee on Commerce
House Committee on Government Reform and Oversight
House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight
House Committee on National Security
House Committee on Science
House Subcommittee on Energy and Environment, Committee on Science

Part III - Management Comments

Deputy Under Secretary of Defense (Environmental Security) Comments

Final Report Reference

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON DC 20301-3000

ACQUISITION AND TECHNOLOGY

10 SEP 1996

DUSD(ES) EQ-CM

MEMORANDUM FOR OFFICE OF THE INSPECTOR GENERAL (OAIG-AUD)

SUBJECT: Project No. 6CB-5006: Strategies for Improving DoD Environmental Compliance Assessment Programs, June 24, 1996

Thank you for the opportunity to review and comment on the DoD Office of the Inspector General report: "Strategies for Improving DoD Environmental Compliance Assessment Programs". The report is helpful and timely, as the Military Departments and the Office of the Deputy Under Secretary of Defense (Environmental Security) (ODUSD(ES)) work to improve DoD's environmental management systems. We concur with the two recommendations for the Deputy Under Secretary of Defense (Environmental Security), and have already begun implementation. The Military Departments also generally concur (comments attached) with the recommendations.

A representative of the ODUSD(ES)-Compliance office will chair a Root Cause Analysis Working Group. It will provide recommendations to the Defense Environmental Security Compliance Committee. The Working Group will review root cause analysis methodologies, and will conduct interviews on this subject with Department of Energy, Office of Environment, Safety, and Health; The Root Cause Analysis Institute; and Texaco.

Following this analysis period, the Working Group will develop draft policy on the use of root cause analysis and make recommendations to DUSD(ES) about the possible adoption of a standard DoD root cause analysis methodology for the Military Departments. The Working Group will particularly take into account the Root Cause Analysis Methods referred to in Appendix E of the IG Report and the methodologies used by Texaco, as reported in Appendix G of the IG Report.

My staff point of contact for this action is Mr. Michael McNerney at (703) 604-1732.

Peter Walsh
Assistant Deputy Under Secretary of Defense
(Environmental Quality)

Attachments

*

Environmental Security — *Defending Our Future*

*Attachments are on the following pages.

Department of the Army Comments

Final Report Reference

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
INSTALLATIONS LOGISTICS AND ENVIRONMENT
110 ARMY PENTAGON
WASHINGTON DC 20310-0110

AUG 1 2 1996

MEMORANDUM FOR INSPECTOR GENERAL, DEPARTMENT OF DEFENSE (AUDITING), ATTN: SAAG-PMF-E

SUBJECT: Follow-up on Evaluation Report on Strategies for Improving Department of Defense Environmental Compliance Assessment Programs, Project Number 6CB-5006

The Department of the Army concurs fully with both of the recommendations provided in the draft Department of Defense Inspector General evaluation report. For some time now the Army Environmental Compliance Assessment System (ECAS) program has been focusing increased attention towards "Root Cause" analysis and directing future ECAS efforts toward evaluating the effectiveness of various environmental management systems.

I appreciate the opportunity for the Army to review the draft report and will look forward to receiving the final report when completed.

My point of contact for this action is Ms. Eunice Vachta, (703) 695-7824.

Raymond J. Fatz
Acting Deputy Assistant Secretary of the Army
(Environment, Safety and Occupational Health)
OASA (I,L&E)

Attachment *

Printed on Recycled Paper

*Attachment omitted because of length. Copies will be provided upon request.

Department of the Navy Comments

Final Report Reference

DEPARTMENT OF THE NAVY
THE ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS AND ENVIRONMENT)
1000 NAVY PENTAGON
WASHINGTON, D.C. 20350-1000

AUG 19 1996

MEMORANDUM FOR DEPARTMENT OF DEFENSE ASSISTANT INSPECTOR GENERAL FOR AUDITING

Subj: DRAFT REPORT ON AUDIT OF STRATEGIES FOR IMPROVING DOD ENVIRONMENTAL COMPLIANCE ASSESSMENT PROGRAMS PROJECT NO. 6CB-5006

Ref: (a) DODIG memo of 24 Jun 96

Encl: (1) DoN Response to Draft Audit Report
(2) DRAFT MCO P5090.2A, Chapter Four

I am responding to the draft audit report forwarded by reference (a) concerning strategies for improving DoD environmental compliance assessment programs. The DoN response is provided at enclosure (1).

The Navy and Marine Corps have effective environmental compliance evaluation programs, but the programs would benefit from a rigorous and formalized root cause analysis component for environmental violations. A working group should be formed to review the various methods used to conduct root cause analysis for environmental violations. It is premature to ascertain whether a standard methodology would be appropriate for the services. My point of contact on this matter is Mr. Paul Yaroschak at (703) 614-1282.

ROBERT B. PIRIE, JR.

*Enclosure (1) is on the following page.

Department of the Navy Response
to
DODIG DRAFT Report of 24 June 1996
on
Strategies For Improving DOD Environmental Compliance Assessment Program
Project No. 6CB-5006

Recommendation 1a:

We recommend that the Deputy Under Secretary of Defense (Environmental Security):

a. Establish a working group to select a standard root cause analysis methodology for adoption by the services.

DoN Position:

Partially concur. A working group should be formed to review the various methods used to conduct root cause analysis for environmental violations. The working group should also develop draft policy on the use of root cause analysis and develop guidelines for adoption by the services. It is premature to ascertain whether a standard methodology would be appropriate. The work group will make this determination.

Recommendation 2:

We recommend that the Assistant Secretary of the Army (Installations, Logistics, and Environment), the Assistant Secretary of the Navy (Installation and Environment), the Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health), and the Commandant of the Marine Corps Deputy Chief of Staff for Installation and Logistics incorporate in-depth root cause analysis of environmental compliance deficiencies in their environmental compliance assessment programs. Specifically, the Services should:

a. Issue policy requiring oversight, reporting and tracking, and follow-up of root cause analysis results.

b. Conduct appropriate training on how to conduct effective root cause analysis.

DoN Position:

Concur, in consideration of our previous comment.

The Navy and Marine Corps have effective environmental compliance evaluation programs. Both the Navy and Marine Corps have performed various analyses of

Final Report Reference

environmental violations. In particular, the Center for Naval Analyses conducted a limited root cause analysis a few years ago. That analysis was hampered by insufficient data. Beginning with the benchmark ECEs to be conducted in FY96 and FY97, the Marine Corps will conduct a more formal trend analysis. This trend analysis will compare the benchmark ECEs of FY96 and FY97 with the ECEs completed during FY93 through FY95. Nonetheless, we believe a more formalized and rigorous root cause analysis program would benefit the program.

**

Since the data collection for this report began over a year ago, the Marine Corps' ECE program has matured. Enclosure (2) is a copy of Chapter 4 ECE from the DRAFT MCO P5090.2A which is in the staffing and comment stage and was not available when the DODIG previously contacted DoN.

Throughout the report, the Navy is referred to as the Department of the Navy, and the Marine Corps is listed separately. The Navy and Marine Corps should be listed under the Department of the Navy.

Page 28

In addition, request that the chart in Appendix D, page 26 of the report be changed as follows: under the Marine Corps heading at the HQ/MACOM Assessment Schedule line, change "every 4 years" to "every 2 years". Since the time the information supporting this report was collected, the Marine Corps has changed its installation evaluation schedule from every three out of four years to every other year.

**Enclosure (2) omitted because of length. Copies will be provided upon request.

Department of the Air Force Comments

DEPARTMENT OF THE AIR FORCE
WASHINGTON, DC

Office of the Assistant Secretary

AUG 14 1996

MEMORANDUM FOR OFFICE OF THE INSPECTOR GENERAL DEPARTMENT OF DEFENSE (OAIG - AUD)

FROM: SAF/MIQ

SUBJECT: Strategies for Improving DoD Environmental Compliance Assessment Programs (Project No. 6CB-5006)

Thank you for the opportunity to review and comment on the DoD Office of the Inspector General's report titled *Strategies for Improving DoD Environmental Compliance Assessment Programs*. Your report not only applies to our Air Force Environmental Compliance Assessment and Management Program (ECAMP), but we feel it applies to our Compliance Tracking program as well. This is important to us as we integrate our programs into an Environmental Management System. We therefore concur with the two recommendations on issuing policy on root cause analysis and conducting appropriate training for root cause analysis.

Our plan of action will develop policies that:

a. Require more thorough root cause analysis reporting, tracking, and follow-up to be incorporated into our internal and external ECAMPs assessments, their respective Management Action Plans, and our Compliance Tracking program.

b. Require reporting and tracking of root cause analysis to higher commands.

c. Establish training requirements for effective root cause analysis.

We will ensure interim guidance on root cause analysis and training is issued Air Force-wide prior to the end of CY96. My staff point of contact for this action is Col Clayton B. Anderson at 614-8458.

R. Craig Postlewaite

R. CRAIG POSTLEWAITE, Col, USAF, BSC
Acting Deputy Assistant Secretary
of the Air Force
(Environment, Safety and
Occupational Health)

Audit Team Members

This report was prepared by the Contract Management Directorate, Office of the Assistant Inspector General for Auditing, DoD.

Paul J. Granetto
William C. Gallagher
Michael R. Herbaugh
Peter J. Larson
Lorretta F. Swanson

INTERNET DOCUMENT INFORMATION FORM

A . Report Title: Strategies for Improving DOD Environmental Compliance Assessment Programs

B. DATE Report Downloaded From the Internet: 11/10/99

C. Report's Point of Contact: (Name, Organization, Address, Office Symbol, & Ph #): **OAIG-AUD (ATTN: AFTS Audit Suggestions)**
Inspector General, Department of Defense
400 Army Navy Drive (Room 801)
Arlington, VA 22202-2884

D. Currently Applicable Classification Level: Unclassified

E. Distribution Statement A: Approved for Public Release

F. The foregoing information was compiled and provided by:
DTIC-OCA, Initials: __VM__ **Preparation Date 11/10/99**

The foregoing information should exactly correspond to the Title, Report Number, and the Date on the accompanying report document. If there are mismatches, or other questions, contact the above OCA Representative for resolution.